

THE
ART
OF
DRAWING
IN
PERSPECTIVE:
WHEREIN

The Doctrine of PERSPECTIVE is clearly and concisely treated of, upon Geometrical Principles; and a Mechanical Method of PERSPECTIVE and DESIGNING invented, for the Benefit of such as are Strangers to Mathematics. Illustrated with Variety of Copper-Plate Figures.

To which are annexed,

The ART of PAINTING upon GLASS, and Drawing in CRAYONS; with Directions for making them after the *French* and *Italian* manner: Also the ART of ETCHING, and that of JAPANNING upon Wood, or any Metal, so as to imitate China; with Instructions for making Black or Gilt Japan-ware, both beautiful and light; and for making the hardest and most transparent Varnishes; and,

To which is added,

A Method of casting AMBER in any Form whatever.

L O N D O N:

Printed for G. KEITH, at the *Bible and Crown*, in *Gracechurch-street*; and J. ROBINSON, at the *Globe and Bible*, at *Dockhead*, 1755. Price One Shilling.

Where may be had, Just Published,

The ART of DRAWING and PAINTING in Water-Colours.
Price One Shilling.

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Of PERSPECTIVE in general.

PERSPECTIVE is the Art of delineating Objects on a plane Surface, such as they would appear at a certain Distance and Height, upon a transparent Plane placed perpendicular to the Horizon, between the Objects and the Eye.

Hence this Art is absolutely necessary for such as would thoroughly understand that of Drawing;
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ing ; and is of the greatest consequence in those of Engraving, Etching, Carving, or Painting : yet Perspective of itself cannot be called a certain Rule in these Arts, but is to be used with Judgment and Discretion ; for, being well understood, if it be applied too accurately, the Practitioner may indeed effect such things as are within the Rules of Art, yet the Work will not always have that agreeable effect, that natural excellency and simplicity, which a less rigorous observance of the Rules of this Art might produce : therefore the young Artist is to adhere to the Precepts of Perspective no farther than as it leads to the Perfection of his Work, or Design ; and when it is not useful to these Purposes he is to neglect it, lest it should misguide him, and lead him to something repugnant to his peculiar Art.

CH A P. II.

DEFINITIONS *in Perspective.*

1. **T**HE horizontal Line is that line supposed to be drawn parallel to the Horizon thro' the Eye of the Spectator ; or rather, it is a Line which separates the Heaven from the Earth, and which limits the Sight. Thus A, B, see the Plate Fig. 1, are two Pillars below the horizontal Line C D, by reason the Eye is elevated above them ;
in

in Fig. 2, they are said to be equal with it ; and in Fig. 3, raised above it. Thus, according to the different Points of View, the Objects will be either higher or lower than the horizontal Line.

2. The Point of Sight A, Fig. 4, is that which makes the central Ray on the horizontal Line *a b* ; or it is the Point where all the other visual Rays D, D, unite.

3. The Points of Distance C, C, Fig. 4, are Points set off in the horizontal Line at equal Distances on each Side of the Point of Sight A.

4. And in the same Figure B B represents the base-line, or fundamental Line.

5. E E is the Abridgment of the Square, of which D, D, are the Sides.

6. F, F, the diagonal Lines which go to the Points of distance C, C.

7. Accidental Points are those where the Objects end : these may be cast negligently, because neither drawn to the Point of Sight, nor to those of Distance, but meeting each other in the horizontal Line. For example, Two Pieces of square Timber G and H, Fig. 5, make the Points I, I, I, on the horizontal Line ; but go not to the Point of Sight K, nor to the Points of Distance C, C :

B 2

these

these accidental Points serve likewise for Casements, Doors, Windows, Tables, Chairs, &c.

8. The Point of direct View, or of the Front, is when we have the Object directly before us; in which case it shews only the Foreside; and, if below the Horizon, a little of the Top; but nothing of the Sides, unless the Object be polygonous.

9. The Point of oblique View, is when we see an Object aside of us, and as it were aslant, or with the Corner of the Eye; the Eye, however, being all the while opposite to the Point of Sight; in which case, we see the Object laterally, and it presents to us two Sides or Faces. The Practice is the same in the side Points, as in the front Points; a Point of Sight, Points of Distance, &c. being laid down in the one as well as the other.

10. Ichnography is the Figure of the Platform in Perspective, or the Plan any thing is to be raised upon.

11. Orthography in Perspective is the Figure of the front or foreside of an Object, as an House, &c. or it is the Figure of such an Object directly opposite to the Eye. As the Ichnography represents the Plan, the Orthography represents the Side opposite to the Eye.

12. Sceno-

12. Scenography is what exhibits the Object quite perfect with all its Diminutions and Shadows, front, sides, height, and all raised on the geometrical Plan.

C H A P. III.

General RULES, or LAWS, in regard to Perspective.

LET every Line which in the Object or geometrical Figure is straight, perpendicular, or parallel to its Base, be so also in its scenographic Delineation, or in the Description thereof in all its Dimensions such as it appears to the Eye; and let the Lines which in the Object return at right Angles from the fore-right Side be drawn in like manner scenographically from the Point of Sight.

Let all straight Lines, which in the Object return from the fore-right Side, run, in a scenographic Figure, into the horizontal Line.

Let the Object you intend to delineate, standing on your right Hand, be placed also on the right Hand of the Point of Sight, and that on the left Hand, on that Hand of the same Point; as also that which is just before, in the middle of it.

Let those Lines which, in the Object, are equidistant from the returning Line, be drawn, in the

scenographic Figure from that Point found in the Horizon.

In setting off the Altitude of Columns, Pedestals, and the like, measure the height from the base-line upward in the front or fore-right Side; and a visual Ray down that point in the Front, shall limit the Altitude of the Column, or Pillar, all the way behind the front Side, or orthographic Appearance, even to the Point of Sight. This Rule must be observed in all Figures, as well where there is a Front or fore-right Side, as where there is none.

In delineating Ovals, Circles, Arches, Crosses, Spirals, and cross Arches, or any other Figure in the Roof of any Room, first draw ichnographically, and so, with Perpendiculars from the most eminent Points thereof, carry it up to the Ceiling, from which several Points carry on the Figure.

The Center in any scenographic regular Figure, is found by drawing cross Lines from the opposite Angles, for the Points where the Diagonals cross is the Center.

A ground-plane of Squares is alike, both above and below the horizontal Line, only the more it is distant either above or beneath the Horizon, the Squares will be so much the larger or wider.

In

In drawing a perspective Figure where many Lines come together, you may, for the directing of your Eye, draw the Diagonals in red, the visual Lines in black, the Perpendiculars in green, or other different Colour, from that which you intend the Figure shall be of.

Having considered the height, distance, and position of the Figure, and drawn it accordingly, with side or angle against the Base, raise Perpendiculars from the several Angles or designed Points, from the Figure to the Base, and transfer the length of each perpendicular from the Place where it touches the Base to the Base on the Side opposite to the Point of distance, so will the Diametrals drawn to the Perpendiculars in the Base, by intersection with the Diagonals, drawn to the several transferred Distances, give the Angles of the Figures; and so Lines drawn from one Point to another, will circumscribe the scenographic Figure.

If in a Landskip there be any standing Waters, as Rivers, Ponds, and the like, place the horizontal Line level with the farthest Sight or Appearance of it.

If there be any Houses or the like in the Picture, consider their position, that you may find from what Point in the horizontal Lines to draw the Front and Sides thereof.

In describing things at a great Distance, observe the proportion, both in magnitude and distance, in the Draught, which appears from the Object to the Eye.

In colouring and shadowing of every thing, you must do the same in your Picture which you observe with your Eye, especially in Objects lying near ; but according as the Distance grows greater, so the Colours must be fainter, till at last they lose themselves in a darkish sky-colour.

C H A P. IV.

Of DESIGNING.

THE Design is the first Idea of a large Work drawn roughly and in little, with an intention to be executed and finished at large ; and this Design, according to the Rules of Mathematicians, makes the Object of Perspective.

The Art of Drawing or Painting has been by some of the greatest Masters divided into the Design, or Draught, the Proportion, the Expression, the Claro-obscuro, the Ordonnance, the Colouring, and the Perspective.

The Design is the simple Contour, or Out-lines of the Figures intended to be represented, or the Lines that terminate and circumscribe them : such
Design

Design is sometimes drawn in Crayons, or Ink, without any Shadows at all; sometimes it is hatched, that is, the Shadows are expressed by sensible Out-lines, usually drawn across each other with the Pen, Crayon, or Graver. Sometimes again, the Shadows are done with the Crayon rubbed so as that there do not appear any Lines: at other times, the Grains or Strokes of the Crayon appear as not being rubbed: sometimes the Design is washed, that is, the Shadows are done with a Pencil in Indian Ink, or some other Liquor; and sometimes the Design is coloured, that is, Colours are laid on much like those intended for the grand Work.

The essential Requisites of a Design are Correctness, Taste, Elegance, Character, Expression, and Perspective. Correctness depends on the justness of the Proportions, and knowledge of Anatomy. Taste is a certain manner of Correctness peculiar to one's self, derived either from Nature, Masters, or Studies, or all of them united. Elegance gives a Delicacy that not only strikes Persons of Judgment, but communicates an agreeableness that pleases universally. The Character is what is peculiar to each thing, wherein there must be diversity, insomuch that every thing has its peculiar Character to distinguish it. The Expression is the Representation of the Parts of a Painting or a Figure, according
to

to the Situation they are in with regard to the Point of Sight.

The Design, or Draught, is a Part of the greatest Import and Extent in Drawing. It is acquired chiefly by Genius and Application, Rules being of less avail here than in any other Branch of the Art, as Colouring, &c. The principal Rules that regard Design are, that Novices accustom themselves to copy good Originals, at first sight; not to use Squares in Drawing, lest they stint and confine their Judgment; to design well from Life before they practise Perspective; to learn to adjust the Size of their Figures to the visual Angle, and the Distance of the Eye from the Model or Object; to mark out all the Parts of their Design before they begin to shade; to make their Contours in great Pieces, without taking notice of the little Muscles and other Breaks; to make themselves Masters of the Rules of Perspective: To observe the Perpendicular, Parallel and Distance of every Stroke; to compare and oppose the Parts that meet and traverse the Perpendicular, so as to form a kind of Square in the Mind, which is the great, and almost the only Rule of Designing justly: To have a Regard, not only to the Model, but to the Part already designed, there being no such Thing as Designing with strict Justness, but by comparing and proportioning every Part

Part to the first. All the other Rules relate immediately to Perspective.

There are several Methods invented of designing mechanically. The following is the Method of the learned Sir *Christopher Wren*, and may be put in practice with great ease. A, Fig. 6, is a small Sight with a short Arm B, which may be turned round about and moved up and down the small Cylinder C D, which is screwed into the piece E D, at D: this piece E D moving round about the Center E, by which means the Sight may be removed either towards E or F. E F is a Ruler fastened on the two Rulers G, G, which Rulers serve both to keep the square Frame S S S S perpendicular, and by their sliding through the square Holes T, T, they serve to stay the Sight either farther from, or nearer to, the said Frame; on which Frame is stuck on with a little Wax the Paper O O O O, whereon the Picture is to be drawn by the Pen I. The Pen I is by a small brass Handle V so fixed to the Ruler H H, that the Point I may be kept very firm, so as always to touch the Paper. H H is a Ruler that is constantly by means of the small Strings *a a a*, *b b b*, moved horizontally or parallel to itself; at the end of which is stuck a small Pin, whose Head P is the Sight which is to be moved up and down on the Out-lines of any Object.

The

The Contrivance of the Strings is this : The two Strings *a a a*, *b b b*, are exactly of an equal length : two ends of them are fastened into a small leaden Weight, which is employed in a Socket on the backside of the Frame, and serves exactly to counterpoise the Ruler *H H*, being of an equal Weight with it. The other two ends of them are fastened to two small Pins *H H*, after they have rolled about the small Pullies *M M*, *L L*, *K K*, by means of which Pullies if the Pen *I* be taken hold of, and moved up and down the Paper, the String moving very easily, the Ruler will always remain in an horizontal Position.

The manner of using it is thus : Set the Instrument upon a Table, and fix the Sight *A* at what height above the Table, and at what distance from the Frame *S S S S*, you please. Then looking through the Sight *A*, holding the Pen *I* in your Hand, move the Head of the Pin *P* up and down the Out-lines of the Object, and the Point of the Pen *I* will describe on the Paper *O O O O* the shape of the Object so traced.

Another mechanical Method of Designing much practised, is by means of the Camera obscura ; being a Machine that represents an artificial Eye, wherein the Images of external Objects are exhibited distinctly in their native Colours, either invertedly or erect. The Camera-

obscura,

Obscura, or darkened Room, is made after two different Methods: one, the Camera-obscura, properly so called; that is, any large Room made dark as possible, so as to exclude all Light but that which is to pass through the Hole and falls in a Ball fixed in the Window in the said Room.

The other is made in various Forms, as that of a Box, whose Sides fold out, &c. for the Convenience of carrying it from place to place.

For the Construction of a Camera-obscura, 1. Darken the Room E F, Fig. 7. leaving only one little Aperture open in the Window at V, on the side I K, facing the prospect A B C D. 2. In this Aperture fit a Lens either plane convex, or convex on both sides. 3. At a due distance, to be determined by Experience, spread a Paper or white Cloth, unless there be a white Wall for the purpose: Then on this, G H, the desired Objects A B C D will be delineated invertedly. 4. If you would have them appear erect, place a concave Lens between the center and the Focus of the first Lens, or receive the Image on a plane Speculum inclined to the horizon under an Angle of 45° or by means of two Lenses included in a Draw-tube instead of one. If the Aperture does not exceed the bigness of a Pea, the Objects will be represented without any Lens at all. And thus the

the Objects may be drawn or copied to the great degree of Accuracy.

For a farther Explanation upon this Head, also for several other mechanical Methods taking Draughts, &c. we refer the curious and unexperienced Reader to *The Art of Drawing, and Painting in Water-Colours*, lately published by the Editors of this Tract.

C H A P. V.

The FOUNDATION, METHOD, &c. of Perspective.

Perspective is either employed in representing the Ichnographies, or Ground-plat of Objects, or the Scenographies, or representation of the Objects themselves.

The Foundation of Perspective may be thus conceived; Suppose the Pentagon *A B D E* Fig. 8, were to be represented by the Rules of Perspective on the transparent plane *V P*, placed perpendicularly on the horizontal Plane *H*. Dotted lines are imagined to pass from the Eye to each Point on the Pentagon, *C A, C B, C D, &c.* which are supposed in their Passage through the Plane *P V*, to leave their Traces or Vestiges in the Points *a, b, d, &c.* on the Plane, and thereby to delineate the Pentagon *a b d e f*; which, as

strikes

strikes the Eye by the same Rays that the original Pentagon A B D E F does, will be a true Perspective Representation of it.

The Business of Perspective therefore is to lay down geometrical Rules for finding the Points a, b, d, e, f , upon the Plane.

By the following Examples it will appear that the whole Practice of Perspective is built upon the Foundation already laid down.

Thus to find the Perspective Appearance of a Triangle, A B C, Fig. 9, between the Eye and the Triangle, draw the line D E, which is called the Fundamental Line; from 2 draw 2 V, representing the perpendicular Distance of the Eye above the Fundamental Line, be it what it will; and through V draw, at right Angles to 2 V, H K parallel to D E: Then will the Plane D H K E represent the transparent Plane, on which the Perspective Representation is to be made. Next, to find the Perspective Points of the Angles of the Triangle, let fall Perpendiculars A 1, C 2, B 3, from the Angles to the Fundamental D E; set off these Perpendiculars upon the Fundamental, opposite to the Point of Distance K, to B, A, C. From 1, 2, 3, draw Lines to the principal Point V; and from the Points A, B, and C in the Fundamental Line, draw the right Lines A K, B K, C K to the Point of Distance K; which is so called

called because the Spectator ought to be so far removed from the Figure or Painting, as it is distant from the principal Point V. The Points $a, b,$ and c , where the visual Lines V 1, V 2, V 3, intersect the Lines of Distance A K, B K, C K will be angular Points of the Triangle $a b c$, the true Representation of A B C.

By proceeding in this manner with the angular Points of any right-lined Figure, whether regular or irregular, it will be very easy to represent it in Perspective: However, in Practice, several compendious Methods will occur to every Artift.

Again, if the scenographic Appearance of any Solid were to be represented; suppose of a triangular Prism, whose Base is the Triangle $m n o$, Fig. 10; you need only find the upper Surface of it, in the same manner as you found the lower, or Base; and then joining the corresponding Points by right Lines you will have the true Representation of the Solid in Perspective. So that the Work is the same as before; only you take a new Fundamental Line, as much higher than the former, as is the Altitude of that Solid whose scenographic Representation you would delineate.

But there is still a more commodious Way, which is this: Having found as above, the Base or Ichnographic Plane $m n o$, let Perpendiculars
be

be erected to the Fundamental Line from the three angular Points, which will express the Altitudes of those Points. But because these Altitudes, though equal in the Body or Solid itself, will appear unequal in the scenographic View, the farthest off appearing less than those nearer the Eye, their true proportional Heights may be thus determined. Any where in the Fundamental Line, let AB be erected perpendicularly, and equal to the true Altitude; or, if the Figure has different Altitudes, let them be transferred into the perpendicular AB ; and from the Points A and B , and from all the Points of intermediate Altitudes, if there be any such, draw right Lines to the Point of Sight V : Those Lines AV , BV , will constitute a Triangle with AB , within which all the Points of Altitude will be contained. Through the Points onm , draw Parallels to the Fundamental Line; and from the Points $a a$, &c. erect Perpendiculars to those Parallels; and the Points where they intersect the Lines AV , BV , as in aa , bb , &c. will determine the apparent Height of the Solid in that scenographic Position to the Eye in V .

In practice, these Parallels and Perpendiculars are easily drawn, by means of a good Drawing-board, or Table, fitted for the Purpose.

To exhibit the Perspective of a Pavement consisting of square Stones viewed directly. Divide the Side AB , Fig. 11, transferred to the Fundamental Line DE , into as many equal Parts as there are square Stones in one Row. From the several Points of Division draw right Lines to the principal Point V , and from A to the Point of Distance K , draw a right Line AK , and from B to the other Point of Distance L , draw another LB . Through the Points of the Intersections of the corresponding Lines draw right Lines on each side, to be produced to the right Lines AV and BV . Then will $AfgB$ be the Appearance of the Pavement $AFGB$.

To exhibit the Perspective Appearance of a square $ABDC$, Fig. 12, seen obliquely, and having one of its sides AB in the Fundamental Line. The Square being viewed obliquely, assume the principal Point V , in the horizontal Line HR , in such a manner, as that a Perpendicular to the Fundamental Line may fall without the side of the Square AB , at least may not bisect it; and make VK the Distance of the Eye. Transfer the Perpendiculars AC and BD to the Fundamental Line DE ; and draw the right Lines KB , KD ; as also AV and VC : Then will A and B be their own Appearances; and c and d the Appearances of the Points C and D .
Conse-

Consequently, $A c d B$ is the Appearance of the Square $A B D C$.

If the square $A C B D$ be at a distance from the Fundamental Line $D E$, which yet rarely happens in Practice, the Distances of the Angles A and B must likewise be transferred to the Fundamental Line; and even the oblique view itself is not very common.

The Reason why Objects appear the smaller as they are at the greater Distance is, that they appear according to the Angle of the Eye where-in they are seen; and this Angle is taken at the Eye, where the Lines terminating the Objects meet.

The Eye A , Fig. 13, for Instance, viewing the Object $B C$, will draw the Rays $A B$ and $A C$ which give the Angle $B A C$; so that an Object viewed under a greater Angle, will appear larger, and another under a less Angle smaller: For that among equal Objects, those at the greatest Distance appear smallest; and consequently, that in all Perspective the remotest Objects must be made the smallest, will be manifest from the Figure: the Objects $B C$, $D E$, $F G$, $H I$ and $K L$, being all equal, but at different Distances from the Eye, it is evident that the Angle $D A E$ is less than the Angle $B A C$, that $F A G$ is less than

$C 2$
 $D A E$,

D A E, that H A I is less than F A G, and that K A L is less than H A I. Hence the second third, fourth and fifth Objects, will appear smaller and smaller, though really all equal, inasmuch as the Angles diminish in proportion as the Objects recede.

If the Eye, on the other hand, were removed to M, K L would appear the largest, and B C no bigger than N O.

Hence it follows, that, as Objects appear such as is the Angle they are seen under, if several Lines be drawn between the sides of the same Triangle, they will all appear equal: Thus all the Lines comprized between the sides O N and O P, Fig. 14. of the Triangle N O P, will appear equal to each other; and as Objects comprehended under the same Angle seem equal, so all comprehended under a greater Angle must seem greater, and all under a smaller Angle, less.

Thus much being premised, if there be a number of Columns or Pilasters to be ranged in Perspective on each side of a Hall, Church, or the like, they must of necessity be all made under the same Angle, and all tend to one common Point in the Horizon O, Fig. 15. For instance, If from the Points D E, the Eye being placed at A, and viewing the first Object D E, you draw the visual Rays D O and E O, they will
make

make the Triangle DOE , which will include the Columns DE, FG, HI, KL, MN , so as they will all appear equal.

What has been said of the Sides is likewise to be understood of the Cielings and Pavements; the Diminutions of the Angles of remote Objects placed either above or below, following the same Rule as those placed laterally. Trees being ranged by the same Law have the same Effect as the Columns, &c. for being all comprehended in the same Angle, and the two Rays having each its own Angle, and all the Angles meeting in a Point, they form a third, which is the Earth, and a fourth which may be supposed the Air, and thus afford an elegant Prospect.

To exhibit the Perspective of a Circle, 1. If the Circle be small, circumscribe a square about it: Draw Diagonals and Diameters ba and de , Fig. 16, intersecting each other at right Angles; and draw the right Lines fg and bc parallel to the Diameter de through b and f ; as also through c and g draw right Lines meeting the Fundamental Line in the Points 3 and 4. To the principal Point V draw right Lines $V1, V3, V4, V2$, and to the Points of Distance L and K draw the right Lines $L2$ and $K1$. Lastly, connect the Points of Intersection a, b, d, f, b, g, e, c with the Arches ab, bd, df , &c. Thus will $abdfbgca$ be the Appearance of the Circle. If

If the Circle be large, on the middle of the Fundamental A B, Fig. 17, describe a semicircle, and from the several Points of the Periphery C, F; G, H, I, &c. to the Fundamental Line let fall Perpendiculars C 1, F 2, G 3, H 4, I 5, &c. From the Points A, 1, 2, 3, 4, 5, &c. draw right Lines to the principal Points V; as also a right Line from B to the Point of Distance L, and another from *a* to the Point of Distance K. Through the common Intersections draw right Lines as in the preceeding Case: Thus we shall have the Points *e, f, g, h, c*, which are the Representations of these A, C, F, G, H, I, which being connected as before, give the Projection of the Circle.

Hence appears not only how any curvilinear Figure may be projected on a Plane, but also how any Pavement consisting of any kind of Stones may be delineated in Perspective.

C H A P. VI.

Of the general PRACTICE of Perspective as it regards Drawing.

THE practical Part of Perspective is only the Application of these Rules to the actual Description of Objects. But as this part is purely Mathematical, its Assistance towards Drawing

Drawing is only what can be performed by Rule and Compass, and can therefore strictly serve only for finding the Images of Points of which they are composed; and as these are infinite, it is endless to find them all by the strict Rules: Whence it becomes necessary after a sufficient number of them are found, to complete the Image by the Help of Drawing; to the better effecting of which these Points serve as a Guide. Thus when a Circle is to be described, the practical Rules serve to find a sufficient number of Points in the Circumference, which, being neatly joined by Hand, will perfect the Image so that in strictness nothing in this Image is found by Mathematical Rules save the few particular Points; the rest owes its being to the Hand of the Drawer.

Thus also, if any complicated Figure be proposed, it may not be easy to apply the practical Rules to the description of every minute part; but by inclosing that Figure in a regular one properly subdivided, and reduced into Perspective, that will serve as a Help, whereby a Person skilled in drawing may with ease describe the Object proposed. Upon the whole, where the Boundaries of the proposed Objects consist of straight Lines and plain Surfaces, they may be described directly by the Rules of Perspective: But when they are Curvilinear, either in their Sides or Surfaces, the practical Rules can only serve for the Description
of

of such right-lined Cases as may conveniently inclose the Objects, and which will enable the Designer to draw them within those known Bounds with a sufficient degree of exactness.

It is therefore in vain to seek by the practical Rules of Perspective to describe all the little Hollows and Prominencies of Objects ; the different Light and Shade of their Parts ; or their smaller Windings and Turnings ; the infinite Variety of the Folds in Drapery ; of the Boughs and Leaves of Trees ; or the Features and Limbs of Men and Animals ; much less to give them that Roundness and Softness, that Force and Spirit, that Easiness and Freedom of Posture ; that Expression and Grace, which are requisite to a good Picture : For the Rules designed to answer these Purposes, the Reader is desired to consult *The Art of Drawing*, already referred to.

Perspective, then, must content itself with its peculiar Province of exhibiting a kind of Rough-draught to serve as a Ground-work, and to ascertain the general Proportions and Places of the Objects, according to their supposed Situations, leaving the rest to be finished, beautified, and ornamented by a Hand skilful in Drawing.

It is true, Perspective is of most use where it is most wanted, and where a Deviation from its Rules would be most observable, as in describing
all

all regular Figures, Pieces of Architecture, and other Objects of that sort, where the particular Tendency of the several Lines is most remarkable: The Rule and Compass, in such Cases, being much more exact than any Description made by Hand: But still the Figure described by the Perspective Rules will need many Helps from Drawing: The Capitals and other Ornaments of Pillars, and their Entablatures, the Strength of Light and Shade, the apparent Roundness and Protuberance of the several Parts, must owe their Beauty and Finishing to the Designer's Hand: But with regard to such Objects as have no constant and certain determinate Shape or Size, such as Clouds, Hills, Trees, Rivers, uneven Grounds, and the like, there is a much larger Latitude allowable, provided the general Bulk, or natural Shape of those Objects be in some measure observed, so as not to make them appear unnatural or monstrous.

But although the strict practical Rules of Perspective are in a great Measure confined to the Description of right-lined Figures, yet the Knowledge of the general Laws of that Science is of great and necessary use to inform the Judgment after what manner the Images of any proposed Lines should run, which way they should tend, and where terminate; and thereby enables it the better to determine what appearance any Objects

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ought

ought to put on according to their different Situations and Distances; it accustoms the Eye to judge with greater Certainty of the Relations between real Objects and their perspective Descriptions; and the Hand to draw the same accordingly; and directs the Judgment readily to discover any considerable Error therein, which might otherwise escape notice. Besides that, when the Ground or general Plan, and the principal Parts of a Picture are first laid down according to the Rules, every thing else will more naturally fall in with them, and every remarkable Deviation from the just Rules will be the more readily perceived, and the easier avoided or rectified; so that altho' it may be infinitely tedious or absolutely impracticable to describe every minute Part of a Picture by the strict mechanical Rules, yet the employing them, where they can be the most commodiously used, will give the Picture in general such a Look as will guide the Artist in Drawing the other Parts, without any obvious Inconsistency.

C H A P. VII.

A mechanical Method of PERSPECTIVE.

FOR the Benefit of such as are unacquainted with Mathematics, we propose to lay down the following Directions, whereby they may lay any Plan in Perspective, and raise Pillars or Buildings

to due Heights, according to their proper Distances.

Suppose, *LLDBA*, Fig. 18, a square Piece of Pavement, consisting of twenty-five Pieces of Marble, each a Foot square: It must be measured exactly, and laid regularly down upon Paper; and for the sake of a more distinct Notion how every particular Square will appear when you have a true perspective View of them, mark every other Stone or Marble black; or else number each of them as in the Figure, which is divided into Squares, every other one of which may be made to appear black, like the three at the bottom marked *BCD*: or 1 2 3 4, answering to those which are marked in Perspective with the same Numbers.

Now to lay your Plan in Perspective, fix your Point of Sight as you observe in the Figure; or more or less to the right or left, as you think proper: Then draw the Line *KK* parallel to, and at what distance you will from *LL*; and raise a Line on each Side from *L* to *K*, to form the Figure you see, as a Frame to your Picture; then draw a Line from the Corner *K*, which is the Point of distance, to the opposite corner *L*; and this Line will regulate your work. Thus far done, draw Lines from the Squares of your Plan to the Point of sight, as exact as possible; and wherever your

Line of Distance cuts those Lines, there draw Lines parallel to the Line *LL*, which will give you the Squares in Perspective, or the true Figure of every Square: Thus *D* in the Perspective Plan answers to *D* in the measured Plan, and 1, 2, 3 and 4, answer to their corresponding Squares in the same Plan.

Now it remains to direct you how to raise either Pillars, Trees, Houses, or any other Bodies, according to their respective Heights, at different Distances and Proportions, on the Plan you have laid down.

Having your Plan measured out in Perspective into Squares of a Foot, or any other measure, let one of these Squares, 1 4 in Fig. 19. serve for the Base of a Pillar a Foot thick. Mark the Line *LK*, by the Scale of the Ground-plan, into equal Proportions or Feet, *a, b, c, d*; which being so many Feet high, and standing on the Base, are Uprights, not in Perspective. Then draw a Line 4 5 parallel to 1 *c*. Join *c* and 5, and then you have the Front of a Body three Feet high and one Foot wide, being that which you was to raise. From 4 draw a Line, with a Black-lead Pencil to the Point of Sight; and from 3 raise a Line parallel to 4 5, till it touches the penciled Line passing from 5 to the Point of Sight, which will give you the side Appearance of the Column.

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Body, as you will see it from the Place where you stand.

Then, with a Pencil, from c draw a Line to the Point of Sight, which will determine the Line 6 7 that bounds the Perspective View of the Column a-top. Afterwards from 2 raise a penciled Line parallel to ac or Lc , till it touches the Line drawn from c to the Point of Sight; draw then 6 7 parallel to $c5$, and you will have the Square of the Top of the Column, as observed from A, which is supposed to be the Place where you stand.

It is to be observed, that the Line drawn from 2 to 6 is only an imaginary Line, and in consequence is to be rubbed out, because not being seen from the Place where you stand, it must not appear in the Drawing. The same may be understood of the Line drawn from 1 to 2; but it is necessary that they appear in the Draught, on account that they direct you how to regulate the top of your Column, and to place it with certainty upon its Base.

Lastly, finish your Column with Lines only, that is from 1 to c , from 4 to 5, from 3 to 7, from c to 5, from 6 to 7, and from 1 to 4, whereby you will have the true Representation of the Column, as in Fig. 20.

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When this is done, you may erect another Column on any one of the Squares in the same manner, observing to fling your Shades all on one side, and being able to master these few Examples, which may cost you very little trouble, you will be capable of doing any thing in this way.



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P A R T II.

The Art of PAINTING upon GLASS, &c.

C H A P. I.

Of Painting upon GLASS.

PAINTING upon Glas is an Art which has generally appeared so difficult that few have succeeded in the Attempt, and yet there is no representation of any Portrait can appear more elegant than in a Picture done well in this manner. For here there is all the Softness and Tendernefs that can be desired in a Picture ; and it is easy to work, as there are no Out-lines to draw, nor any Shades to make, but the Colours are put on without the trouble of either.

The Pictures which are used on this Occasion are those done in Mezzotinto ; for their Shades being rubbed down with an Instrument on the Copper-plates, the several Lines which are drawn to represent the shady Part of any common Print are, by this means, joined together, and appear as soft and united as in any piece done with Indian Ink.

Being provided with such Prints as you like, cut off the Paper of the Margin, so that none be left but the Print itself: then taking some of the

finest Crown-glass, have it cut exactly to the Size of your Prints; and having well cleaned the Glass, lay some Venice Turpentine, as thin as possible, on one side thereof, with a Brush made of Hog's Hair; and if you perceive the Turpentine to lie unequally, pass a Piece of Wood made like a flat Ruler over it, till it lies equal in every Part: then wet the Back of your Print with a Sponge dipt in Water, and lay it with the Picture-side next the Turpentine upon the Glass; taking care that every Part of it lie close to the Glass, and that there are no Bubbles nor Blisters to be seen: then you may roll it over with a wooden Roller made like a Cylinder, of two Inches diameter, to fix it close to the Glass. When this is done, wet the Back of your Print with a Sponge as before, till the Paper will rub off with your Fingers: then rub it gently till there remains only the Picture itself on the Glass, and thus you will have all the Lines and Shades very visible; and as if it was a fine Drawing in Indian Ink. Then let it remain till the next Day to dry; for otherwise the Colours will not take, because they are ground in Oil.

MATERIALS proper for Painting upon Glass.

THE several Sorts of Colours ground in Oil for this purpose, and tied up in little Bladders may be had at most Colour-shops. Of these you are to provide as follow:

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W H I T E S.

Flake-white.

White-lead.

Y E L L O W S.

Engliffh Pink.

Yellow Oker.

Dutch Pink.

Yellow Orpiment.

R E D S.

Rose Pink.

Vermilion.

Red-lead.

Indian Red.

Lake.

Carmine.

B L U E S.

Ultramarine.

Blue-bice.

Verditer.

Pruffian Blue.

Saunders Blue.

Indigo.

B L A C K S.

Lamp-black.

Ivory-black.

G R E E N S.

Verdigreafe diffilled.

Verdigreafe and Yellow
Oker mixt.Verdigreafe and Engliffh
Pink mixt.Verdigreafe and Dutch
Pink mixt.

B R O W N S.

Spaniffh Brown.

Umber.

Being provided with thefe Colours, you may mix them one with another to what degree of Colour you think proper, upon a Pallet, by means of a fmooth Knife, with a tender bending Blade, adding a little more of one Colour to another, and mixing them well till you have them to your Mind.

To get the Colour out of the Bladders, prick a Hole at the bottom of each Bladder you design to ufe, and prefs the Bladder till you have Colour enough upon your Pallet only for the prefent Ufe;
for

for in a Day's time the Colours will dry and can never be recovered.

For Painting upon Glafs, the Artift is directed to provide himfelf with a Box about two Foot and a half long, five Inches high, and fixteen wide with Partitions in it as follow.

N ^o 1. Turpentine Oil, to clean Pencils. N ^o 2. To put the Leavings of the Colours in.	N ^o 4. For dry Colours.	N ^o 5. For Pencils and Sticks.
	N ^o 6. For the Colours in Bladders, and for the Pallet.	
	N ^o 3. For Bottles of Oil, and a Knife.	

It is thought expedient that the Ufe of this Box, which is to keep all the Materials requifite for Painting upon Glafs together, and preserve them clean, fhould, along with the Ufe of thefe Materials, be particularly explained.

N^o 1.

N^o 1. must be a Box of tinned Iron placed in the great wooden Box for holding Oil of Turpentine, to clean the Pencils after having done your Work.

In Painting, you must take care to use only one Pencil in a Colour; or to have a Pencil for each; and as soon as you have done using them for the Day, to clean them from the Colours, by dipping them into the Oil of Turpentine, and laying the hairy Part of the Pencil upon the tinned Division between N^o 1 and N^o 2, pressing your Finger pretty hard upon the Hair, and drawing it four or five times over the Tin, by which means the Colours that come out of the Pencil will fall into the tin Box N^o 2, and the Pencils will be clean and the several mixtures of Colours that fall there with their Oils will become a good Size for Gold.

Then lay your Pencils with their Sticks in the Box N^o 5, whereby they will be fit for use upon the next Occasion. It is to be remarked that the Pencils should be of two Sorts, that is, some of Camel's Hair, being such as will come to a Point, when the Colour is in them, and some dry Brushes of white Hair, to be used only for joining one Colour with another, when they are just laid on, in order that they may appear soft, and that the Place where the Painter leaves off abruptly may not be distinguished.

The

The Painter upon Glafs should at leaft have three Dozen of Camel's Hair-pencils with Sticks to each about ten Inches or a Foot long, made of Cedar or Brafil-wood; though fome nice Persons have them turned in Ivory.

At N^o 4, there fhould be a cafe of Wood divided into feveral Parts for keeping your dry Colours in, fuch as Carmine and Ultramarine with others to grind upon occafion: Thefe Divifions ferve to keep the Colours from mixing with each other, and thereby fpoiling one another. The finer or richer Colours, fuch as Ultramarine or Carmine, may rather be bought thus in Powder than ground in Oil, becaufe in that cafe they are apt to dry by degrees and be loft.

The Method of grinding thefe in Oil is, to put a little of either of them upon a polifhed Marble, and with a Drop or two of Oil to mix them by means of a foft bladed Knife, and then lay it on your Pallet. It may be obferv'd that a very little of either Ultramarine or Carmine will ferve, becaufe the leaft touch of either on the light Sides of your Drawing will give the Picture a caft.

If you have occafion to grind any other Colour coarfer than thefe in their Powder, you muft be provided with a Muller made of a very hard Stone and finely polifhed; Porphery made in the Shape of a Sugar-loaf is the beft Sort of Muller, though
Marble

Marble is good, as is also any Stone that will bear a Polish, and even Glass, Crystal, or any such like Materials.

In grinding a large Quantity of Colours, you are to consider that your Oil must be in proportion, and never so much as to overcome the Quantity of Colour, which in the Grinding you may observe will frequently turn from under the Muller; in that case scrape it up with a Knife, and place it under the Muller again till it is as fine as you desire it. Then put it immediately into a Piece of Bladder, after having first immersed the Bladder in Warm-water, to soften it; then tie it up, and let it remain to be used as directed underneath.

Let the Partition, N^o 3, be lined with Tin or tinned Iron, because it is to enclose the Bladders of Turpentine and Linseed Oil, as also those of Nut and burnt Oil, which you should always keep by you; and which, in the taking in and out, would grease and stain the Wood; whereas the Tin will preserve it from any stain from the Oil.

N^o 6, which is in the middle of the Box, should also be made of Tin or tinned Iron, to take in and out at pleasure; because it is to contain all the Bladders of oiled Colours; and as some of them will frequently be used, the Place
for

for keeping them must otherwise become greasy. Over these should be laid the Pallet, which, every Night after having done your Work, should be cleaned from the Colours put upon it; or else covered with its Colours in Water till the next Day. To keep your Pallet clean, rub it with Oil of Turpentine and a coarse linnen-cloth; and afterwards with Nut or Linseed-oil, till it is dry.

But take what care you will of your Oil-colours in small quantities, when they are exposed to the Air, there will be a Coat, or thick hard Crust over them in a Day or two, which indeed may be taken off with a Knife, but yet much of the Colour will be lost. After this Crust is taken off, the rest of the Colours will be fit for use; and if it is too thick, you may put a Drop or two of Linseed-oil to it, and mix it well with a tender bladed Knife. Some People in using Ultramarine and Carmine, on account of their great Price, only put a Drop of Oil upon their Pallet, and put as much Colour to it as they think will be sufficient; thus working them together with a Knife, which is, without doubt, more saving than to mix it on the Stone.

The manner of using the COLOURS in Painting upon GLASS.

AS the Lines and Shades of your Picture happen to open, so you ought to dispose your Colours ;

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ours ; that is, lay the lighter Colours first on the light Places of your Prints, and the darker over the shaded Places ; and if you have once laid on the brighter Colours it is no great matter whether the darker sorts are laid a little over them : for the first Colour laid on will hide those laid on afterwards. As for Example,

Y E L L O W S.

The lightest Yellow may be laid on first, and the Dutch Pink will shade it.

R E D S.

The Red-lead may be laid on first, as the brightest Red Colour ; and to shade it with Lake or Carmine will bring your Picture to a beautiful Scarlet, equal to the finest Tincture of the Dye of Cochineal.

B L U E S.

Lay on first the Blue-bice, and shade it with Indigo ; or else take Ultramarine and lay it on in the lights, and shade it with Indigo.

G R E E N S.

Lay on first some Verdigrease, and then a mixture of that and Dutch Pink ; and you may make this Green as Yellow as you desire it by adding more Dutch Pink as you see occasion.

Let it be remembered, that, when any of these Colours are too strong, they may be lightened to any degree, by mixing White with them upon
your

your Pallet; or you may, on the other hand, darken them as much as you think fit, by mixing them with deeper Colours.

Having painted your Glafs it must stand dry for three or four Days, before it be fit to put in a Frame.

CH A P. II.

Of the making of CRAYONS for dry colouring.

THE Use of Crayons for dry colouring is so necessary in taking Views and Prospects, and there are so few Crayons that are good of the sort, that the way of making them is thought a necessary Article to be known by every one who is a Lover of Drawing and Painting.

W H I T E.

As to White, we have no occasion for any other than that of white soft Chalk, which should be sawed into lengths of an Inch and a half, or two Inches; and there are little Saws made on purpose for such uses, about four Inches long and very thin.

When you have sawed your Crayons of Chalk, which should be at most a quarter of an Inch thick, round off the Corners with a Penknife; and

and point them, by drawing your Penknife upwards from the Place where the Point is to be. You ought to have a Dozen or two of these, to be in a Case by themselves; or they will be discoloured by the other Colours.

YELLOW PASTILS, or CRAYONS.

Yellows come next, which should be divided into four or five degrees of Colour.

First Yellow. Take some Grounds of Starch and Flour of Brimstone, mix them well with a Knife upon a polished Marble, so that they produce the Colour of Straw, or such a Yellow as will shew itself faintly; then pour a little Milk to them, or a little pale Ale-wort, till the Colour becomes like a PASTE; then spread the PASTE on a smooth Piece of Chalk, with a broad Knife, till it is about the third Part of an Inch thick, and let it lie till it is half dry; then with a sharp Knife cut it in lengths of an Inch and a half, about the fourth Part of an Inch wide, and roll it thin between two little Pieces of Board, till it is round like a Straw, and point it as is directed for the Chalk. If you please you may use ground Chalk instead of Grounds of Starch.

Second Yellow. This is made of yellow Oker, ground well with fair Water, and then dried and beat. Mix it with ground Chalk, in such a quantity as that it may be a little deeper than the former Colour, and mix this up with pale Ale-

E

wort,

wort, in which a little white Sugar-candy may be dissolved; and make these into Crayons as the former.

Third Yellow. Grind yellow Oker with Water, with a Stone and Muller, and when it is dry, beat it very fine, and make it into Pastils or Crayons, with pale Ale-wort, or Size made with Glover's Leather, boiled in Water till it comes to a Jelly; use it as before directed, and roll the Pastils between two Boards.

Fourth Yellow. Take English Pink, grind it as the former with Water, and when it is dry, beat it fine, and mix it with a very little ground Chalk, till it is deeper than the former Colour; then put to it some wort of pale Ale, and stir all well together, and make it into Pastils or Crayons, by rolling it in the foregoing manner.

Fifth Yellow. English Pink is to be ground as the former, and to be made in Pastils or Crayons by itself, with pale Ale-wort.

Sixth Yellow. Dutch Pink is to be used as the former, and mixed with pale Ale-wort, or Milk, is to be rolled and dried.

Seventh Yellow. Orpiment is one of the most poisonous Colours that can be used; however it is one of the most beautiful sort, and is next to Orange-colour. This must have a little ground Chalk mixed with it, well tempered together, and made up with pale Ale-wort, with a little

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Gum-dragon dissolved in it ; and then rolled up into Pastils like the former.

ORANGE-COLOURS.

First Orange-colour. Take yellow Orpiment, mix it with pale Ale-wort, and when it is in PASTE roll it, and make it into Pastils or Crayons.

Second Orange-colour. Take Orpiment and Red-lead, (let the Red-lead be very finely ground in Water, and dried) then mix a little of this with your Orpiment, till you have the Colour you desire ; and putting in it some Ale-wort, wherein some Gum-dragon has been dissolved, make it into a PASTE, and roll it into Pastils or Crayons.

Third Orange-colour. Take English Pink, grind it well, and put to it as much Vermilion as will make it of the Colour you desire ; mix these up with Ale-wort, that has been boiled till it is more glutinous than ordinary, and make it into Pastils or Crayons as before.

Fourth Orange-colour. Take English Pink finely ground, and put to it as much Red-lead, well ground, as will make it agreeable to your design, mix these well with Ale-wort boiled to a thickness, and make them into Crayons.

Fifth Orange-colour. Take some Dutch Pink, well ground, and mix it with some Red-lead finely powdered, to the Colour you want ; then with Ale-wort, or Milk, make it into a PASTE, and make that into Pastils as before. Take

Take care in the mixture of these Colours that they have as many different Shades as possible.

RED S.

First Red. Take Red-lead, grind it well with Water, then dry it and beat it to a fine Powder, and put to it some Chalk or White-lead finely ground to brighten it; mix this with Ale-wort, wherein a little Gum-dragon has been boiled, make it into a PASTE, and roll it into Crayons. Of this your Pastils should be made some deeper, others paler.

Second Red. Take Red-lead, and grind it well with a Marble and Muller, make it into a PASTE with Ale-wort, in which Gum-dragon has been boiled.

Third Red. Red-oker wants no preparation, but sawing as directed for Chalk, in the first Article.

Fourth Red. Take Vermilion, ground fine, and mix it with some fine Chalk, or White-lead, well pulverized; divide the composition into three Parts, and by adding more of the White to one than another, you may make three different Colours; then put Ale-wort boiled thick to each, and make them severally into PASTE, and then into Pastils.

Fifth Red. Take Vermilion, grind it well, and mix it with Ale-wort, that has been boiled

to

to a thicknefs with Gum-dragon, till it is a Pafte, then roll it into Crayons or Paftils.

Sixth Red. Take fome good Lake, well ground with Water upon a Marble, and when it is well dried and powdered, divide it into three Parcels, and mix with each as much Chalk or White-lead ground fine, as will make them of different Colours, then work them feverally into Pafte, and afterwards into Crayons.

Seventh Red. Take fine Lake, and reduce it to as fine Powder as you can, with Water; and when it is dry, and again finely powdered, mix it with Ale-wort, and make it into Paftils or Crayons.

Eighth Red. Take Indian Red, grind it well with Water, and dry it like the other Colours; then mix it with Ale-wort that has been boiled to a thicknefs with a little Gum-dragon. This alone will be a very ftrong Colour; but you fhould mix fome of it with White in two or three different manners, to be Shades to one another.

Ninth Red. Take Rose Pink, and cut it into the Shape of Crayons, without any preparation. Carmine may be too dear for them, for a Shilling's worth would make but a very fmall Crayon.

PURPLES.

First Purple. Take Rose Pink finely ground and powdered, mix it well with a little Saunders-blue,

blue, till the Powder appears of the Colour you desire it ; then make it into a Pafte with Ale-wort thickned with Gum-dragon, and roll it into the Figure of Crayons.

Second Purple. Take Lake finely ground and washed, put it to as much Blue-bice as is fufficient to make it of a reddish Purple ; and vary this in two or three manners, each lighter than the other. In the lighter Sorts, put a fufficient quantity of Chalk, or White-lead well ground, and mix them up with Ale-wort boiled to a thicknefs with Gum-dragon, and roll them into Paftils.

Third Purple. Take fome Lake well ground, and add to it as much Pruffian Blue as will make it of the Colour you desire ; mix thefe very well together in feveral Parcels, making fome more inclining to Red than the others ; and to the fainteft Purple of them add ground Chalk at pleafure ; and make thefe feverally into Pafte with Ale-wort thickned by boiling, fo make them after the fame manner as the former into Paftils.

B L U E S.

First Blue. Blue-bice is the lighteft Blue-colour that is ufed, it muft be well ground with common Water on a fine Marble ; and allowing it to dry, reduce it again to Powder, afterwards lay it in four Parcels, and to three of them put fome Chalk, or White-lead, in different proportions, fo that when they come to be mixed every

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one may be lighter than the other. Mix these separately with Ale-wort thickned with Scraps of Glover's Leather; and after being in PASTE to your mind, make them into Crayons. The fourth Part of the Blue-bice must be made up by itself in the like manner.

Second Blue. Take Verditer well ground on a fine Marble, lay it in four Parcels, and mix one of them purely with a thin Size made of Glover's Shreds and Ale-wort, and mix the other three Parts with several proportions of Chalk, or White-lead, well ground, so as to make Shades to one another; make these into PASTE with Ale-wort thickned with Gum-dragon, and then into Crayons.

Third Blue. Take some Prussian Blue well ground, lay it in four Parcels on your Marble, and with three of them mix some Chalk, or White-lead, well ground, to make them of different degrees of Colour, and the fourth must be alone. Make the three mixed Colours into a PASTE with pale Ale-wort boiled till it thickens; and the plain Colour into a PASTE with Ale-wort boiled and thickned with Shavings of White-leather from the Glovers. Make all these into Pastils.

Fourth Blue. Take Rock-indigo well ground with Water on a Marble; dry it, and reduce it to Powder a second time; then divide it into Parcels as before, and with two or three Parts of

of these Parcels mix different proportions of ground Chalk, or White-lead ground, to make them deeper or paler, and let one Part be the simple Colour. To the mixed Colours put some Ale-wort thickened with boiling; and mix them to Pastes, and then make them into Pastils.

As for the plain Indigo mix it with Ale-wort thickned by boiling with Glover's Shreds of white Leather, and then make it into Crayons.

BLACKS.

First Black. The Black commonly used as a Crayon is Charcoal cut into lengths; the softest and best is that made of Willow. You should have a Dozen of these at least, because Black and White are much more used than any other Colour.

Second Black. Take Ivory-black ground very fine with common Water, and add to it a very small quantity of ground Indigo, for a bluish cast will enliven the Black, and help that deadness which a plain Black always carries with it.

BROWNS.

First Brown. Take for a light Brown some Fuller's Earth; grind it well with Water, and mix with it some ground Chalk, or White-lead, to make it into different Colours, that is, lighter or darker as you think proper, mix this up with pale Ale-wort boiled thick, and have at least four Sorts of it.

Second

Second Brown. Take some Spanish Brown ground very well, and mix it with some Fuller's Earth to make it lighter, because the Spanish Brown is a dark Colour of itself; and having made this mixture, you may put a little Chalk to some of it, or White-lead ground in different proportions, to make it of different Shades. These being by far the lighter Browns, mix them severally in Pastes with a light Size of Fish-glue, or Isinglass and Water; and mix some of them with pale Ale-wort boiled thin, or thick Water-gruel boiled with Gum-dragon; then make them into Crayons.

Third Brown. Take Spanish Brown ground fine, and some Indian Red; mix these well together, and to that put some pale Ale-wort, till it becomes a Paste. You may make some of this Colour lighter with Chalk, or White-lead ground; then roll it into Pastils.

GREENS.

First Green. Take some Verdegrease, and boil it in sharp Vinegar: when it boils, add a little Tartar powdered, which will so dissolve the Verdegrease, that the Liquor will be of a fine Colour; then set the Liquor in little Gallipots, exposed to the Air, which will dry the Colour, and then it will dissolve in common Water. This may be taken with as much warm Ale-wort as will cover it, and will dissolve the Green; then

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make it into Pastils, with ground White-chalk, as much as you think fit.

Second Green. Take distilled Verdegrease ground with Vinegar on a Marble, wash it well with Water; the manner of which is, to throw the Verdegrease into Water, and in half a Minute to pour off the Water into a Cup, and let it settle; then pour the Water from it, and wash it again in the same way, and when this is dry, make it into Pastils with Ale-wort.

Third Green. Take Verdegrease prepared as before, finely powdered, and mix it with a little Prussian Blue in several proportions. In the lightest Sorts put a little White, or the brightest Yellow well ground, to make varieties of Colour; mix all these with pale Ale-wort boiled to a thickness.

Fourth Green. Take Indigo well ground, and some English Pink; mix these well together upon a Marble, and when they are well powdered, make them into a Paste, and roll them up with a soft Size and Oil into the Shape of Crayons, or with pale Ale-wort or thick Water-gruel; but when you use Water-gruel, it must be strained and boiled with some Gum-dragon.

Fifth Green. Take Blue-bice ground fine, add to it some Dutch Pink well ground; mix them in Parcels, and prepare them in Shades to

one another; then make them into Pastes, and roll them into Pastils.

The Liquid you use to make them into Pastils, must be Ale-wort boiled a little thick.

Sixth Green. Take Rock-Indigo ground very fine with Water on a Marble, and when it is dry beat it fine again; then divide it into Parcels on the Marble, and to some of them put a little Flour of Brimstone in greater or lesser quantities; to others Flour of Brimstone and Dutch Pink mixed, so that you may have a variety of Colours. When you have thus made the different Shades you intend, then make them into Pastes with Ale-wort thickned by boiling with white Glover's Shreds of Leather, or a little Gum-dragon; and roll them into Crayons.

Seventh Green. Grind Rock-Indigo with Water, and put to it in several Parcels, as much Dutch Pink as you think fit, to make your Greens of various Shades; when these are well mixed, put to them some Ale-wort thickned by boiling, with which make them into Pastes; then roll them into Pastils.

The Reason why these Pastils are better than those which in common are bought at Shops, is because they are generally made too stiff with Gums, and so will hardly touch the Paper; all these will work freely, and express the several Colours you desire.

The Reason why you are to make five or six Shades of each Colour is, because we cannot mix any when we use them ; whereas in Oil-painting, and Painting in Water-colours, we can make what Mixtures we please in an instant : And when we are about any Painting or Drawing in Crayons, which happens to have a great Variety of Colours in it, we ought to have every sort of Colour that can be thought on.

These Colours should be kept in a Box partitioned, every sort by itself, *viz.*

The White.

Yellows. Lay the brightest Sorts in one, and the deeper Sorts in another, till you come to the Orange-colours.

Orange-colours. The lighter sorts in one apartment, and the deeper in another.

Reds. The paler Sorts, or Flesh-colours, in one apartment, the brighter Reds in another, the stronger Reds in another, and the deepest Reds in another ; every one with its proper Shades, till we come towards Purple.

Purples. The paler Sorts inclining to Red in one apartment ; the next Sorts, more inclining to Blue, in another, with their Shades ; and those which are next to Blue, with their Shades, in a Part by themselves.

Blues

Blues should follow the Purples ; put the lightest in the first apartment, the next degree in another, a third into another, and the fourth to the last into others : But the Prussian Blue keep quite by itself, and its mixtures by themselves ; it serves very well in this way to supply the Place of Ultramarine, and it is much cheaper. And besides, in this way of Crayon-drawing, the Preparation of Prussian Blue does very well answer the same End, though that Colour will not do in Water-colours, nor even last in Oil-colours, if it comes to be exposed to the Weather : for in either case it changes to a dirty Yellow-colour, but it is found that the Crayons hold by being embodied as is directed above.

Greens should be divided into three or four sorts, and with their Shades be laid in several apartments.

Browns should be likewise laid in three or four Parcels with their proper Shades, and be laid each in an apartment of one great Box, and the Painter should never be without Crayons of Charcoal in another case. With all these he will be completely furnished, and when he goes out to take any View he should have one of every sort divided after the foregoing manner to carry in his Pocket.

The Paper which should be used on this Occasion is rough Venice-paper, almost like our

whited brown Paper, which the stiffer it is the better ; and that sort of it which is called Cape-paper is by Experience found to be the best, because upon such the Colours most easily distribute themselves. By this means every one may take Figures in their proper Colours, as they naturally appear to the Eye, because he may match the Colours as they appear, with the Crayons he has got by him ; and as the Crayons are dry they will not alter their Colour : but the wetted Colours will appear deeper when they are wet than when dry, which is apt to deceive the Eye of a Beginner.

Instructions for the Use of CRAYONS.

WHEN you use your Crayons, remember that you point them from the Bottom upwards, and that you do not make the Points too sharp, unless in the White-chalk, the Red-oker, and the Charcoal.

A good pretty Sort of Drawing may be made on Blue-paper with only Chalk and Charcoal ; the strong Lights and the dark Shades make a fine Contrast, and a pleasant Appearance in a Drawing.

For the Principles of Drawing, and the Directions necessary for attaining that useful Art, together with some farther Instructions on the Doctrine

trine of Colours of all Sorts used in Painting, we would recommend to the Reader a careful Perusal of *The Art of Drawing, and Painting in Water-Colours*, already referred to.

C H A P. III.

The Method of ETCHING.

ETching is a manner of Engraving on Copper, wherein the Lines or Strokes, instead of being cut with a Tool or Graver, are eaten in with Aqua-fortis.

Etching has several Advantages over Graving, first, as being done with more Ease and Expedition; secondly, as requiring fewer Instruments; and thirdly, as representing curious kinds of Subjects better and more agreeably to nature, as Landskips, Ruins, Grounds, and small, faint, loose, remote Objects, as Buildings, &c.

Of the proper Instruments, Materials, and Method of preparing these Materials, used in ETCHING.

THE principal Instruments for Etching, are the Etching-needles, the Oil-stone, Brush-pencils, the Burnisher, the Scraper, the Compasses, the Ruler, the Stiff, and the Frame and Trough: the Materials are the hard and soft Varnish, prepared Oil, and Aqua-fortis.

The Needles are to be chose of several Sizes, of a fine Grain, and such as will break without bending. These are to be fixed in round Sticks, of firm Wood, about six Inches in length, and of the thickness of a large Goose-quill: they are to stand out of the Sticks about a quarter of an Inch, or something better. Of these you should have twenty at least, which may be fixed in such Sticks as to have a Pencil at the other End.

The Use of the Oil-stone is for whetting the Needles, which, if you would have the Points round, much be whetted short upon the Stone, by turning them round; and if you would have them sloping, they are first to be blunted upon the Oil-stone, and then whetted sloping on one side only, till they come to a short and roundish Oval.

The Brush-pencil is to cleanse the Work, wipe off dust, and to strike the Colours even over the Ground or Varnish, when laid upon the Plate.

The Burnisher is a well hardned Piece of Steel, somewhat roundish at the End, for smoothing and giving a Lustre to the Plate, &c.

The Scraper is one of the Instruments fitted for clearing the Plate of all deep Scratches or Strokes which the Burnisher will not take away.

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The chief Use of the Compasses is in measuring Distances, or striking Circles, or some Part or Portion of them, where you would have your Work to be exact.

The Ruler is used chiefly in drawing all the strait Hatches or Lines of the Design upon the Plate; or to mark out Distances upon strait Lines.

The Stift is used for drawing through all the outmost Lines or Circumferences of the Print, Pattern, or Drawing, which is etched after.

The Frame is an entire Board, about the Top and Sides whereof is fastened a Ledge about two Inches broad, to keep the Aqua-fortis from running off from the Sides, when it is poured on: the lower End of this Board is to be placed in the Trough, and to lean sloping against a Wall, or some other thing, in which are to be placed six several Pegs of Wood to rest the Plate upon.

The Trough is made of a fine firm Piece of Elm or Oak, set upon four Legs, the hollow whereof is to be four Inches wide, and of such a Length as may be fit for use. The hollow must be something deeper in the middle than elsewhere, that the Water running thither may fall through a Hole (made there for that purpose) into an earthen Pan well leaded. The inside of this Board
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and Trough must be covered with a thick Oil-colour to hinder the Aqua-fortis from eating or rotting the Board.

The hard Varnish for etching is made as follows. Take Burgundy or Greek Pitch, ten Ounces ; of Colophony or Rosin, the same Quantity ; of Nut-oil, eight Ounces ; melt the Pitch or Rosin in an earthen Pan over a slow Fire ; then put in the Oil, and let them boil for the Space of half an Hour : after this set it on a slower Fire, and let it cool a little till it appear like a gluey Syrup : then cool it a little more ; strain it, and when it is almost cold, put it into a glazed Pot for use. This will keep good for upwards of seven Years.

To make the soft Varnish for etching, take of Virgins-wax six Ounces ; Mastich in Drops, four Ounces ; Asphaltum, two Ounces : grind the Mastich and Asphaltum, separately, very fine ; and sift them through a very fine Hair-sieve : then melt the Wax in an earthen Pot, and strew in the Mastich and Asphaltum, stirring them upon the Fire, till they are well dissolved and mixed, which will be in about half an Hour : then let it cool a little and pour it into a Bason of fair Water, but suffer not the Dregs to go in : afterwards having wetted your Hands take it out of the Water, and make it up into Rolls before it is cold.

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If it be for a red Ground, take Red-lead, grind it very well, and temper it with Varnish ; if for a white Ground, take Rosin, four Ounces ; Wax, two Ounces ; melt them together, adding Venetian Cerufs, finely ground, four Drams ; and if for a black Ground, take Asphaltum, two Ounces ; Bees-wax, one Ounce ; melt them together, and while they are warm lay the Mixture thinly on with a Lawn-rag.

To make the prepared Oil, heat Olive-oil in an earthen Pan, and putting to it as much Sheep Suet as that being dropt upon a cold thing, the matter will be a little hardened and firm, let these boil together for the Space of an Hour, till they become of a reddish Colour, lest they should separate when they come to be used.

To make the Aqua-fortis : Take of distilled White-wine Vinegar, one Quart ; of Sal-armoniack and Bay-salt, each four Ounces ; of Verdegrease, almost three Ounces ; put all these together into a pretty large earthen Vessel well glazed, and covering the Pot close, set it over a quick Fire, taking care that the mixture does not boil over ; give it as speedily as you can two or three great walms, and no more ; when it is ready to boil, uncover the Pot and stir it now and then with a Bit of Stick, taking care that it does not boil over : when it has boiled take it off, and set it

it by to cool, keeping it still close covered, and when it is cold, put it into a Glass-bottle with a Glass-stopple.

If it proves too strong in Etching, it may be weakned with a glass or two of the same Vinegar you made it of.

The Method of preparing the PLATE, and using the VARNISH for Etching.

TAKE a Copper-plate about the Size of the Work to be Etched; hammer it very even and smooth; then take a Pumice-stone, free from Gravel, and thereby rub it with a little Water; and afterwards, with a few Drops of Olive-oil, rub it well with your Burnisher, and rub that with a Piece of Charcoal dipped in Water. Then with a Roller made of black Felt, Castor, or Beaver-hat dipped in Olive-oil, rub it well for an Hour or more, till the Plate is glazed and sufficiently polished.

The Plate being polished, heat it over a Chafing-dish of Coals, and with a little Stick take some of the first Varnish, and put a Drop of it on the tip of your Finger, with which touch the Plate lightly and at equal Distances; laying on the Varnish equally, and heating the Plate again as it grows cold, preserving it carefully from gathering any Dust or Filth. Then, with the ball
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of your Thumb, daub it upon the Plate, still wiping your Hand over all, till you make it smooth and equal, in which case great care is to be taken that the Varnish is not too thick, nor your Hand sweaty.

This being done, take a great lighted Candle, that burns clear with a short Snuff, and placing the Corner of the Plate against a Wall, and holding the varnished Side of the Plate downwards over the Candle as close as you can, not to touch the Varnish, guide the Flame all over the Plate, till it is all perfectly blacked, and preserve it from Dust and Filth till it is dry.

Hang the varnished Plate to dry over a charcoal Fire, with the varnished Side upwards, which will smoke: when the Smoke abates, take away the Plate, and with a pointed Stick scratch the near side of it, and if the Varnish comes off easily, hang it over the Fire again for a little while, till the Varnish will not easily rub off: then take it from off the Fire, and set it by to cool.

If the Varnish should be too hard, cast cold Water on the backside of the Plate.

The Method of using the soft Varnish is as follows. Having made the Plate ready as before, rub it well over with fine white Chalk scraped and a fine Rag, not touching it with your Fingers.

gers. Then lay the Plate over a Chafing-dish, and having tied up some of the Varnish in a fine Rag, rub it up and down the Plate, so that as it melts, it be neither too thick nor too thin: then smooth it as well you can all one way with a Duck's Feather; and afterwards crosswise, till it lies smooth and even. But care must be taken that the Plate be not too hot, for if it lies till the Ground smokes, the moisture will be dried up, which will occasion the Ground to break, or fly up and spoil the Work.

Then having ready some Cerufs or White-lead, ground with Gum-water, so that it is of a convenient thickness for spreading on the Copper, strike the Plate with it cross over twice or thrice, till it is smooth, with a large Pencil or small Brush made of a Squirrel's Tail, and after this set it by till it dries.

General Directions for ETCHING.

THE Method of Etching is as follows. The Plate being covered over with a peculiar Ground or Varnish, as already directed, and that side blackened with the Smoke of a Candle, the Back of the Design or Draught is laid over the Varnish, being first rubbed with Red-chalk: then the Design being laid on is to be transferred upon the varnished side of the Plate. This is done by tracing over all the Lines and Strokes of the Draught

Draught with a Needle or Point, not very sharp, which, pressing the Paper close down to the Ground, causes the Wax to lay hold of the Red-chalk, and thus brings off with it the Marks of the several Lines, so that at length it shews a Copy of the whole Design in all its correctness.

In the mean time, it is necessary to observe, that such Parts of the Plate as you do not work upon is to be covered with a Sheet of fine white Paper, and a Sheet of brown Paper over that ; upon this you may rest your Hand to keep it from the Varnish. If you make use of a Ruler lay some part of it upon the Paper, that it may not rub off the Varnish ; and take an especial care that no Dust or Filth get in between the Paper and the Varnish, because that would hurt it.

The Draught or Design being thus chalked, the Etcher next proceeds to draw the several Lines and Contours with a pointed Tool through the Grounds upon the Copper. In doing this, he makes use of Points of various Sizes, and presses them on more strongly or lightly according as the several Parts of the Figures, &c. require more or less strength or boldness.

This being done, a Rim or Border of Wax is raised round the Circumference of the Plate, to keep in the Aqua-fortis, and prevent it from running

ning off at the Edges ; and then it is poured on the Plate so prepared. The Ground or Varnish with which the Plate is covered defends it every where from the corrosive Quality of the Aqua-fortis, except in those Lines or Hatches cut thro' the Ground with the Points, which lying open the Water passes through them into the Copper, and eats into it the depth required, which being done it is poured off again.

It is to be observed, that the Aqua-fortis must not continue equally long, or be poured on equally over all the Parts of the Design : the remote Parts must first be eaten more slightly than those nearer to the View. For effecting this, a composition of Oil and Grease with which they cover all the Parts that are to be bitten no farther, is made use of ; or else this Composition is at first laid on as a defensative, and taken off again when they find it proper. In a word, they are every now and then covering or uncovering one or another Part of the Design as occasion requires.

The Management of the Aqua-fortis is the principal Matter in the whole Art of Etching, and that on which the Effect of the whole chiefly depends. The Workman must be observant as to the Ground, that it does not fail or give way in any part to the Aqua-fortis ; and if in any place it does, to stop up that with common Varnish.

nish. It must be also observed, that a fresh Dip of Aqua-fortis must never be given without first washing out the Plate in fair Water, and drying it at the Fire.

When the Aqua-fortis has performed its Part, the Ground must be taken off, and the Plate washed and dried; after which the Artist must examine it with his Graver in his Hand, to touch it up and heighten it where the Aqua-fortis, &c. has missed.

Particular Directions for ETCHING.

IN making Lines or Hatches, as there must be some bigger and some less, some strait and some crooked, you must use several Sorts of Needles, bigger or less, as the Work requires. The large Lines are made by leaning hard on the Needle, the Point being short and thick; (but a round Point will not cut the Varnish clear) or by making divers Lines or Hatches very close to one another, and then passing over them again with a thicker Needle; or by making them with a pretty large Needle and letting the Aqua-fortis be the longer thereon.

If your Lines or Hatches should be of an equal thickness from end to end, lean on the Needle with an equal force; leaning lightly where you would have the Lines or Strokes fine or small;

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and heavier where you would have them appear deep or large. If the Lines are too small, pass over them again with a short but round Point, of such a bigness as you would have the Line of, leaning strongly where you would have it deep.

The manner of holding the Needle with oval Points, which is most proper for making large and deep Strokes, much resembles that of a Pen; only the flat side whetted is usually held next the Thumb; yet it may be used with the Face of the Oval turned towards the Side of the little Finger.

If you would end with a fine Stroke, you should draw it with a fine Needle; and in using the oval Points, hold them as upright and strait in your Hand as you can, striking your Strokes firmly and freely, for that will add much to their beauty and clearness.

In etching Landskips, you must use slender Points for faint Strokes to those Places at the greatest Distance from View, as also those nearest the Light; and you must be careful, while at work, to brush off all the Dust worked off with the Needles.

It is necessary to observe that you ought to be so far master of the Art of Drawing as to be able to copy any Print or Painting exactly, and to

draw after good Heads of Plaister or Figures, according to your own Fancy, and to shadow every thing exactly according to Art: and therefore, when you imitate Plaister, be sure to take the true Out-lines or Circumferences; and taking notice how the Shadow falls, to do it very faint, as soft as the Design requires. Therefore it is convenient that you be able to hatch with the Pen exactly, after good Copies; and when you can do that, to draw after Plaister, and then to draw from the Life.

In order to take the Out-lines in any Drawing or Print upon the Ground of the Plate, you must scrape a little White-lead on the backside: then take a Feather, and rub it over every where alike, and shake off that which remains loose.

Having done this, lay the Print on the Plate over that side where the Lead is, and fasten the four Corners of it to the Plate with a little soft Wax: then take the Stift and draw upon the Print all the outmost Lines or Circumferences exactly. When you have done this, take off the Print from the Plate, and all the same Out-lines and Circumferences which you drew upon the Print with a Stift, will exactly be found upon the Ground.

Then you must observe exactly how your Original or Pattern is shadowed, how close the Hatches

are joined, how they are laid, and which way the Light falls or comes in; this must be made to fall one way, and if the Light falls sideways in the Print, you must hatch that side darkeſt which is fartheſt from the Light; and ſo place the Lights altogether on one ſide, and not confuſedly, part on one ſide and part on another.

Take heed how cloſe all the Hatches join, how they incline, and which way they twiſt and wind: this follow as exactly as you can, but before you begin to hatch or ſhadow, you muſt not fail to draw all the Out-lines with a Needle upon the Ground as artificially as you can, and ſhadow it with your different Needles according to the Original.

In Landſhips, that part next the Eye, as was already obſerved, is to be hatched darkeſt, and the reſt is to decline in its Shadows by degrees the farther it is off from view. The ſame Method is to be obſerved in etching a Sky, for that which is neareſt to the Eye muſt be ſhadowed darkeſt, but in general as ſoft and faint as poſſible, loſing itſelf gradually, as directed before; and by how much nearer the Sky comes to the Ground, by ſo much the more looſe and faint muſt it be made to appear, and where they both meet as it were together, the Sky muſt be quite loſt.

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In etching Letters, screw the Copper-plate (after it has been prepared for etching in the manner already directed) in a Hand-vice, then hold it over a Charcoal-fire till it be warm ; rub a Piece of Virgin-wax all over the Plate, spreading it very even with a Feather, and then letting it cool. The Letters being written on Paper with ungummed Ink made with Vermilion, lay the written Side downwards upon the waxed Plate, and fasten the four Corners with a little soft Wax, placing the Writing so exactly that the Lines may run strait. Then rub the Backside of the Paper all over with a Dog's-tooth, taking care not to miss any part thereof, and taking the Paper off the Plate, you will find all the Letters written on the Paper left exactly on the Wax. Then draw all the Letters through the Wax on the Plate with a Stift, and afterwards clean the Work from the loose Wax with a Linnen-rag or Pencil-brush ; and lastly pouring on the Aqua-fortis the Letters will be etched : All the former Operations being performed, wash the Plate with fair Water, and set it wet upon the Fire till the Mixture be well melted ; then wipe it very clean on both Sides with a Linnen-cloth till it is thoroughly clear of all the Mixture. In the next Place take Willow-charcoal, and pulling off the Rind, put fair Water on the Plate, and rub it with the Charcoal, as if you were to polish it, and by this Operation you will get off the Varnish ; only you must remember

member that the Coal is to be free of all sorts of knots and roughness, and that no sand or filth fall on the Plate. After this, adding two third Parts of fair Water to one third Part of common Aqua-fortis, dip a Linnen-rag in it, which by rubbing the Plate all over will restore it to its former beauty. However, it is necessary that the Plate be wiped after this with dry Linnen-rags to take off the said Water, this is done by holding it a little before the Fire, putting on a little Olive-oil, and, with the Fur of an old Beaver-hat rolled up, rubbing the Plate all over before it is wiped with the dry Cloth.

Lastly, If any Places require to be touched with the Graver, as it frequently happens, especially where it is to be very deep or black, carefully correct them; and then the Plate is fit to be carried to the Rolling-press.

C H A P. IV.

Of JAPAN and INDIAN VARNISHES.

Of Japanning of Metals.

IN japanning of Metals it is to be observed that Steel or Iron may be japanned or varnished with any Colours: also that Part of the Metal designed for japanning in Colours should not be polished, and those Parts which are to be polished ought to be done before the Painting

other

otherwise part of the Colour is liable to break off in the Polishing.

The manner of japanning Metals is as follows. Take any Colour you think proper, and grinding it well with Water on a Stone, by means of a Muller, let it dry ; and grind it afterwards in a Mortar, sifting it, if there is any occasion : then instead of Oil, mix it with white Varnish, and lay it by for use.

The Whites are Cerufs or Flesh-white.

The Yellows are Yellow-oker, English Pink, and Dutch Pink.

The Reds are Vermilion, Red-lead, and Lake.

The Blues are Bice and Indigo.

The Blacks are Lamp-black, and Ivory or Bone-black.

The Greens are Verdegrease ground, or Verditer and Dutch Pink ground together.

The Browns are Fuller's-earth and Spanish Brown.

And the Purples may be made between Red and Blue, till you perceive they are to your mind.

The manner of japanning Iron Snuff-Boxes, &c. so as to look like China gilt about the Edges, is as follows :

T A K E White-lead ground with Water, and drying it, beat it again to fine Powder, and mix it with Size. Let this preparation be laid equally
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on the Top and Bottom of your Iron-plates or Snuff-boxes, and afterwards suffer them to dry well. Then, about the Rims or Edges of the Box, lay some Yellow-oker with Size, and over that some Gold-size; and when this is well dried, lay on the Gold-size mentioned in the Colour-box; and this being near dry, lay on the Gold-leaf, that it may stick the better. Remember to have a Cushion of woollen Cloth to cut your Gold-leaf upon, that the Pieces of Gold may be exactly of the Size and Shape you require.

Then taking your Leaf-gold on some Cotton, lay it on the Part done with Gold-size, and laying it smooth, let all dry: this being done, paint whatever Figures you think proper on the upper and under Side of your Box, &c. upon the white Ground principally with Blue-bice mixed with white Varnish, and shaded with Indigo; and when this is dry wash the white Part with white Varnish, and the gilded Part with the gold Varnish.

Method of making White or Amber-Varnish, from a Manuscript of Mr Boyle.

MELT about two Drams of White-resin in a clean glazed Pipkin, putting to it, by little and little, an Ounce of very white Amber; beat it to a fine Powder, and stir it over a gentle Fire till it is dissolved; then when you find it growing stiff,

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pour in now and then a little Oil of Turpentine, continuing to do so till the Amber is melted. In the mean time, be careful lest it set fire to the House, because the very Vapours of the Oil of Turpentine will take fire by heat alone; and if it should happen to take fire, your best way of extinguishing it is immediately to clap a flat Board or wet Blanket over the Pot, which by keeping the Air from it will either put it out, or suffocate it.

Therefore in making this Varnish you are cautioned to melt the Resin in a Glass of a cylindric Figure, on a Bed of hot Sand, after the Glass has been well annealed or warmed by Degrees in the Sand; and under this you are to keep a very gentle Fire.

Having made your Varnish, pour it into a coarse linnen Bag, and press it between two hot Boards of Oak or Iron, after which you may use it with any Colour, as well as to varnish them over when they are painted.

After varnishing your Snuff-boxes, &c. with this white Varnish, you may put them into a declining Oven, to dry and harden the Varnish.

But to cover Gold, you must use the following hard Varnish (taken also from a Manuscript of Mr Boyle) which will bear the Muffle, and may serve to lay over Brass or any other Metal, that

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appears like Gold, as well as Gold itself, to keep it from turning black, as the Bath-metals and such like are apt to do, when exposed to the Air. It is to be made thus: Melt half an Ounce of Colophony in a glazed Vessel: then strew in by degrees an Ounce of powdered Amber, stirring it all the time, and when this begins to harden or resist the Stick, put in a little Oil of Turpentine, which will immediately soften it; then sprinkle in an Ounce of powdered gum Copal, every now and then pouring in some Oil of Turpentine; and strain the Varnish as already directed. The things done with this Varnish must also be put in a declining Oven for three or four Days successively; by which means it will resist even Fire.

To japan Brasses, in the manner used to gild Brasses-buttons, so as to make them look like Gold.

THIS may be used upon Leaf-gold, or upon what is called the German Leaf-gold: or upon Brasses and Bath-metal, that is designed to imitate Gold, in the manner following.

Put a Pint of the Spirit of Wine into a retort Glass, and adding a quarter of an Ounce of Gamboge, half an Ounce of Lake, and half an Ounce of Gum-mastic, set it in a sand Heat, or near the Fire, or put the Body of the Retort frequently in warm Water for six Days together, shaking it twice or thrice a Day; then set it over a Pan of warm

warm small-coal Dust, and having first well cleaned the Metal, do it over thinly with this Varnish, and it will appear of the Colour of Gold, and will not rub off, after being well dried in a declining Oven.

This is a good Varnish to mix with any Colours that incline to Red, as the white Varnish is to mix with those that are pale, or with any other sort of Colours.

Of japanning on Wood or Paper, with Directions for making several sorts of Japan Wares, either in Gold, Silver, or in Colours.

THE People of Japan have a Method of making Plates, Bowls, and other Vessels, of Brown-paper, and sometimes of fine Saw-dust, which are very light and strong, after they have been varnished.

The Method of making them is as follows: Boil a quantity of Slips or Pieces of Brown-paper in common Water, mashing it with a Stick, while boiling, till it turns almost to a Paste; then take it out of the Water, and pound it in a Mortar, till it is reduced to Rags like those pounded in the Trough of a Paper-mill. That done, take Gum-arabic, of which and common Water make a strong Gum-water, a quantity sufficient to cover the Paper-paste an Inch thick; put these together

ther in a large glazed Pipkin, and let them boil, stirring them well together, till the Paper-paste is impregnated with the Gum : then have a Mould ready to give the Paste the Form or Shape you design it.

The Mould is made as follows. Suppose, for example, you design to make a Vessel in the Form of a pewter or earthen Plate, procure a hard Piece of Wood turned on one side in the Form of the Plate, with a Hole or two made in the middle quite through the Wood : then get another Piece of the like Wood, and much of the same Figure, and alike turned, but about the eighth Part of an Inch less than the former ; and this last may have some little Ornament carved or engraven on the Wood. Oil these Moulds very well on the Sides that are turned, and continue to oil them till they are well soaked, by which time they will be fit for use.

Then take that Mould which has the Hole in it, and having oiled it again, set it even upon a strong Table, and spread over it some of your Paste, as equally as possible, so as to be every where a Quarter of an Inch thick : then oil the other upper Mould very well, and set it as exact as possible upon your Paste, and pressing it down very hard, and setting a great weight on it, let it stand for twenty four Hours.

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It may be observed, that the Hole at the bottom of the Mould is for the Water to pass thro' that is pressed or squeezed out of the Paste, and that the oiling the Mould is to prevent the gummed Paste from sticking to the Wood.

When the Paste is dry, it will be as hard as a Board, and fit to lay a Ground upon, which Ground should be made with strong Size and Lamp-black: then let it stand to dry leisurely, and when it is thoroughly dry, mix Ivory-black finely ground with the following Varnish.

To make the strong Japan-varnish.

TAK E an Ounce of Colophony, and having melted it in a glazed Pipkin, take three Ounces of Amber reduced to a fine Powder; this sprinkle, by little and little, into the Pipkin, adding now and then some Spirit of Turpentine: when this is melted, throw in three Ounces of Sarcocolla finely powdered, stirring it all the while, and putting in frequently more Spirit of Turpentine, till all is melted: then pour it through a coarse Hair-bag placed between two hot Boards, and press it gently till the clear Part is received into a warm glazed Vessel. Mix ground Ivory-black with this Varnish; and having first warmed the Paper-plate, &c. paint it in a warm Room before the Fire, as equally as you can, and set it into a gentle Oven; the next Day put it into a

hotter one ; and the third Day into one still hotter ; and let it stand there till the Oven is quite cold ; and then it will be fit for any use, either for containing Liquors cold or hot ; this Varnish will never change, nor the Vessel break, without some great violence.

It is thought probable, that if the Moulds were cast of any hard Metal, they might do better than those turned in Wood.

To make these Vessels of a Gold-colour.

PREPARE your Plates, Bowls, or any other Vessel, according to the Method before directed ; or it may be done in the manner following. Take fine Saw-dust, and having dried it well, pour on it some Turpentine mixed with an equal quantity of Rosin, and half as much Beeswax : mix them well, and put them to your dry Saw-dust, stirring all together till the mixture becomes as thick as a Paste. Then take it off the Fire, and having warmed the Moulds, spread some of your mixture on that which has the Hole in the middle as equally as can be done, and press down the upper Mould upon it : then set it by, and letting it stand till it is cold, it will be fit for Painting.

When the Turpentine is melted, you may put in some Sarcocolla finely powdered, about the
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Quantity of half the Turpentine, stirring it well; and this will harden it. The Composition ought to be made in the open Air, because being apt to take fire it may endanger the House.

But whatever of the Mixtures is used, in order to make them look like Gold, let them be done over with Size, and when that begins to stick a little to the Fingers, lay on Leaf-gold either pure or of the German sort: but it is to be observed, that the German Leaf-gold is apt to turn Green, as most of the Preparations of Brass will do, such as those of Bath-metal and others of the like kind, which look like Gold, when they are fresh polished or cleaned every Day, but being exposed to the Air, will soon change to an ugly Colour: therefore Gold is rather to be chosen, as it is not only a finer Colour, but by reason it never changes. And though the Leaf-gold is tender and may be subject to run off, yet the Varnish with which it is covered will keep it bright and entire.

After the Gold has been laid on, and the Gold-size is dry, and the loose flying Pieces brushed off, then lay on the following Varnish to brighten the Gold, and preserve it from rubbing.

Varnish for Gold, or such leaf of other Metals as imitates Gold.

MELT some Colophony: then put in two Ounces of Amber well pulverized, with some

Turpentine, as the Amber thickens, stirring it well: then add an Ounce of Gum-elemi well powdered, and some more Spirit of Turpentine; still keeping the Liquor stirring, till it is all well mixed: but take care to use as little Spirit of Turpentine as you can, because the thicker the Varnish is, the harder will it be.

Let this Operation be performed over a Sand-heat in an open Glass, and strain it as directed for the former Varnish.

Use this Varnish alone, first warming your Vessels made of the Paper-paste, and lay it on with a Painting-brush before the Fire; and afterwards harden it by degrees at three several times in Ovens; the first being of a slow Heat, the next a warmer Oven, and the third a very hot one: and these Vessels will look like polished Gold.

You must observe, that for those Vessels which are made with Saw-dust and the Gums, you may use a Varnish made of the same Ingredients as above, excepting only the Gum-elemi; and this will dry in the Sun, or in a very gentle warmth.

To make these paper, &c. Vessels of a Red-colour with gilded Figures on them.

THE Vessels being prepared as before directed, with brown Paper-paste, after they are dried,

dried, &c. as directed for the first, mix some Vermilion with the Varnish first directed, and use it warm; then stove it, or harden it by degrees in an Oven, and it will be extremely bright; or else lay on the first Ground with Size and Vermilion, and with Gum-arabic and Water stick on in proper Places some Figures cut out of Prints, as little Sprigs of Flowers, or such like; and when they are dry, do them over with Gold-size, and let them remain till it is a little sticking to the touch. Then lay on the Gold, and let that be well closed to the Gold-size, and dried; then if you have a mind to shade any part of the Flower, trace over the shady Parts on the Leaf-gold with a fine Camel's Hair-pencil and some Ox-gall, and then paint upon that with deep Dutch Pink; and when that is dry, use the Varnish in 'a warm Place, (*i. e.* that Varnish directed for the covering of Gold) and when you have done, set it to harden by degrees in an Oven. This Varnish will secure the Leaf-gold, or German metal from changing, by keeping the Air from it.

The Method of SILVERING these japan Vessels.

AFTER the Vessels have been made, and are thoroughly dried, do them over with Size, and with ground Chalk or Whiting; let them stand by till they are very dry, and then paint them over again with the brightest Gold-size you
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can get, (for there is a great deal of difference in the Colour of it; some of it is almost white, and other yellow; the latter is proper for Gold, and the former for Silver.) When this Size is almost dry, lay on the Leaf-silver, and close it well to the Size, brushing off the loose Parts, when it is dry, with some Cotton.

When you lay on your Leaf-silver or Gold, keep it free from the Air, for the least Motion of the Air will wrinkle the Leaves so as they will not lie smooth: then use the following Varnish to cover the Silver.

To make the Varnish to cover the Silver.

MELT some fine Turpentine in a well glazed Pipkin: then take an Ounce and a half of white Amber well pulverized; put it by degrees into the Turpentine, stirring it well till the Amber is all dissolved: then put in half an Ounce of Sarcocolla powdered, and half an Ounce of Gumelemi well levigated, pouring in at times more of the Turpentine-spirit till all is dissolved. Let it be done over a gentle Fire, and keep stirring the Mixture continually while it is on the Fire.

This Varnish will be as white and strong as the former, and being used warm, is as strong as that laid on the Gold; and when it is afterwards hardened by degrees in an Oven, in the manner
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of the Gold-varnish, the Vessel will look like polished Silver.

Varnish in japanning of Wood, to mix with several Colours.

TO make a Varnish to mix with Colours, dissolve Spirit of Turpentine over the Fire in a little gum Tacamahaca till it is a little thickned: use this with any Colour that has been well ground with Water, and afterwards pulverized: your Work being done, varnish over your Piece with that directed to colour Silver,

DIRECTIONS for imitating China or Porcelain Ware on Tea-Tables, &c. upon gold or silver Grounds.

PREPARE your Tea-Tables, &c. as already directed: then marking out your Designs upon them, paste on some Paper in proper Places, and when your Paper is dry, draw your Designs upon them, and paint them with Water-colours: then with a Brush lay gold or silver Size on the other Part, and when that is almost dry, lay on some Gold or Silver-leaf; and all being dry, varnish over with the white Varnish, if it be a silver Ground; or with the strongest Varnish, if it be a gold one; except only the Ovals or Circles, which must be done with the white Varnish; being so transparent that all the Paintings will appear through it. If you lay on a gold Ground,
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or any other Colour darker than that, then let your Paintings be blue and white; or if it be silver or light Ground, then use the most fiery Colours in your Paintings.

The Method of GLAZING PRINTS with white Varnish, so as to bear Water and a Polish.

THE best Method for this purpose is first to paste your Print on a Board, or a Piece of Shock-cloth strained on a Frame: to do this well, prepare some stiff Starch, and with a Sponge dipped in Water, or thin Starch, wet the Back of your Print; and if you design to lay it on a Board, dip a large Brush in the thick Starch, and brush it over the Board as even as possible; and let it dry: then a second time repeat the same Operation, and continue it till the Veins or Grain of the Wood are quite filled. In the last Operation, when the Starch is just laid on, lay your wet Print upon it as even as possible; press it close every where till it lies smooth, and so let it dry. In this Operation let your Hands be clean, to prevent soiling the Print, and in about twenty four Hours it will be dry enough to varnish over with the following one.

Take Isinglass four Ounces, and pulling it into small Pieces, boil it in a Quart of Brandy, or some other strong Spirit, in a glazed Pipkin; and when, by taking out a little, you find it will
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make a strong Glue, by being a little exposed to the Air, it will answer the Purpose. Having made this Glue as strong as you can, while it is hot wash over the Print with it, by means of a Brush, as quick as possible, and let that stand for a Day or so : wash it over again in the same manner, and let it dry well : afterwards brush it over at such a Distance from the Fire that it may not be too hot, otherwise it will blister : do this also two or three times over, then set it up for a Day or two, and brush it over again with the Varnish three or four times, and let it stand a Day or two. Afterwards varnish it a third time, and in three or four Days polish it with a soft Linnen-cloth, and some fine Tripoli-oil, rubbing it very gently till it remains as smooth as possible ; and cleaning it with Flour and Oil, it will then appear as bright as Crystal ; and if it should at any time be soiled by Flies or the like, you may wash it with a Sponge and Water, which will clean it.

The white Varnish is made as follows. Take of the clearest and whitest Sort of gum Sandarach one Pound, gum Mastich one Ounce, gum Sarcocolla one Ounce and a half, Venice Turpentine three Ounces, Benzoin half an Ounce, white Resin half an Ounce, and Gum-animæ an Ounce and a half : then mix and dissolve these different Ingredients in the following manner. Put the Sarcocolla and Resin into a little more Spirits
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than will cover them, to dissolve therein: then put the Gum-animæ, Benzoin, and Venice Turpentine into a Glass or glazed Vessel, and pour on as much Spirits as will serve to dissolve them; and in like manner dispose of the Gum-mastic and Sandarach in a separate glazed Vessel, and in another of the same sort put the Gum-elemi, with Spirits sufficient to dissolve it.

In this Process let it be observed that the gums Animæ, Sarcocolla, and Benzoin, must be pulverized, while the Resin need only be a little broken.

While these things are dissolving for three or four Days, shake the Bottles twice or thrice a Day, after which put all the Mixtures together in a glazed Vessel, stirring them well; and then strain the Liquor and Gums gently, beginning with the latter, through a Linnen-cloth, which will prevent any filth getting into the Varnish. Afterwards put it into a Bottle, and letting it stand a Week before you use it, pour off as much of the clear Part only as you may want for present use.

If you put your Print upon Shock-cloth well strained in a Frame, brush over the Cloth with strong Paste made with Flour and Water, and immediately brush over the Back of your Print with well prepared Starch: then brushing the
Cloth

Cloth over again with the same Starch, lay on your Print as smoothly and equally as possible. Let them remain thus in a dry, warm Place for a Day or two, and then varnish your Print with the Glue made of Isinglass, as already directed, and then with the white Varnish.

With this Varnish you may mix up any Colour that has been ground dry upon a Marble, and paint with it upon any Figure you have drawn, or upon any Print you have pasted upon your Work : but the varnished Colours should be chiefly put upon the shady Parts.

A Varnish of Seed-lacca is made as follows. Put a Quart of strong Spirits into six Ounces of Seed-lacca in a large glass Vessel, and shaking it often let the Mixture stand for two Days : then pass the Liquor through a Flannel-bag or the like, and squeezing the Gums every now and then, till all is strained and nothing but the dry Gum remains, put it into Bottles, keeping them close stopped till you perceive all the thick Parts settle to the Bottom, which will be in three or four Days : then pour off the clear Liquor into another Bottle, and it will be fit for use.

Directions for colouring of Draughts, or Prints of Birds, Flowers, &c. in japanning.

IF the Prints or Drawings of Flowers be in black and white, and the Center of the Flower
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be rising, then touch the Edges of the Lights with a thin Tincture of Gamboge, and lay on some Dutch Pink or Gall-stone over the Shades, so as to run into the Lights but a very little. This is to be done by reason that the Thrums in the middle of Flowers are generally yellow, but if they are of any other Colour, as blue, in proportion as they are lighter or darker, the Verges of the lighter ones are to be touched with a little ultramarine Blue, and over the Shades either some Saunders Blue to run a little into the Ultramarine, or else Indigo; and some of the white of the Print being left void of Colour, will then give Life and Spirit to the Colours so disposed.

All the Flowers should be tenderly touched in the light Parts, just to give a little glare to the light Parts of the Colour you would give to the Flower-leaves: and if you paint from a natural Flower, you will presently see that you must lay on the most shady Part such a Colour as will force the rest to appear forward: however, you are not to daub over the Shades with too heavy a Colour: let it rather be such if possible as may be transparent, and mix that into the light Colour that was laid on before. The Pencil, upon this occasion, must be used lightly, with very little Gum-water in it, and before the Colours are quite dry.

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In painting the Leaves of Plants and Herbs, regard must be had to the Colours of the Greens, that sometimes being the chief distinguishing Character. Of Greens, Verdegrease is the lightest, therefore that Colour should be touched into the light Parts of the Leaf, from the Place where the lightest Parts of the Shades end : and then on the shady Parts lay some Sap-green, so as to unite with the Verdegrease-green ; and if the natural Leaf be of a darkish Colour, touch the lighter Sides of the Leaves with a little Verdegrease-green and Dutch yellow Pink mixed together, or with a Tincture of French Berries, but so as to let the Verdegrease shine more than the Pink.

The leaving the Lights, in colouring a Print, has two Advantages ; *viz.* If the Lights be left on this occasion, the whiteness of the Paper serves instead of using white Paint, which is a heavy Colour, and would rather confound those that have been prescribed to be laid on, than do them any service : but the Colours before directed, when there is no white laid on, will shine agreeably into the white of the Paper.

General Observations in regard to VARNISHING.

IN varnishing Wood, let it be very smooth, close grained, free from grease, and rubbed with Rushes.

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Lay on your Colours as smooth as possible, and if the Varnish has any Blisters in it, take them off by a Polish with Rushes.

In laying on the Varnish keep your Work warm, but not too hot.

Begin in the middle, and stroke the Brush to the outside ; then to another extreme Part, and so on, till all is covered : for the Brush, was you to begin at the Edges, would leave Blots there, and make the Work unequal.

In fine Works, use the finest Tripoli for polishing ; do not finish your polishing at one time, but after the first polishing, let it dry two or three Days, and polish again for the last time.

In the first polishing you may use a good deal of Tripoli, but in the last a very small quantity will serve the purpose. Wash off the Tripoli with a Sponge and Water ; dry your Varnish with a dry Linnen-rag, and clean your Work with Oil, Whiting, and Lamp-black.

Directions for taking off any Figure from China or Japan-ware, without any previous Knowledge in Drawing.

LAY a Piece of oiled Paper over the Figure you would copy, so as to hold the Piece steady, till you can trace out the Lines of the Figures:
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then lay the oiled Paper on another Paper blacked on one side, and the blacked Side of that one on a clean Paper: this done, trace the Lines with a Pen, or blunted Point of a Needle, till the Lines are all impressed on the white Paper, and draw them over with a Black-lead Pencil; and mark the Shades where they separate from the light Parts of the Colours, in the manner you see them painted on your Pattern. After this cut out your Figures close to the Out-lines, and fix them upon your ground of Whiting and Size, or of Size with ground Chalk, thick gum Arabic and Water; and when they are quite dry paint them, the lighter Parts in Water-colours, and the shady Parts with Varnish mixed with the darker Colours.

When these are dry, wash all over with the white Varnish before the Fire, but not so hot as to make the Varnish rise in Blisters. When the Varnish is dry, lacker it again with the same Varnish, and repeat it a third time: then scrape some Tripoli very fine, and with a soft Rag dipt in Water, take up a little of the Tripoli at a time, and polish it by gentle rubbing till it is smooth: then wash off the Tripoli with a soft Sponge and Water; after which, with a fine dry Cloth, wipe off the Tripoli, and when that is dry clean it with Whiting and Oil, if it is a white Varnish: or with Oil and Lamp-black, where the Varnish is black.

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But the common way of doing this is to cut out Prints, and then to paste them on such Parts as is thought proper, and afterwards to colour them with Water-colours, and varnish them with white Varnish. This is an easy method of Painting, on account that the Shades of the Print, when a transparent Colour is laid on, will give the Light and Shade to your purpose, without using a dark and light Colour.

A Method, from Mr Boyle, of casting Amber in any Figure whatever, with Flies or any small Animals in it, in imitation of those valuable Pieces of Amber sold at a high Price.

MELT some Turpentine in a Glass with a strong Sand-heat where the Fire may be raised at discretion. Then, having some Levigated Amber of the finest sort, either white or yellow, sprinkle it into the melted Turpentine, stirring it all the time with a Piece of Fir-wood, till you find no resistance : afterwards, if you perceive the melting Mixture to resist the Stick, drop in by degrees a little Venice-Turpentine, and keep it continually stirring, till all the powdered Amber is dissolved, and is thick enough to pour into Moulds : then, when it turns cold, you will have whatever Figure you propose remaining as hard as the Amber itself, with all the same Qualities that Amber commonly has.

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